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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/700,832 | 11/04/2003 | Badhri Narayan | 87256NAB | 5774 |

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EXAMINER

PHAM, HAI CHI

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2861

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/700,832

Applicant(s)

NARAYAN ET AL.

Examiner

Hai C. Pham

Art Unit

2861*

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-50 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/04/03, 05/24/05</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 37-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Each of the claims 37-39 claims a “method for forming an image onto a photosensitive medium” but fails to provide any method steps related to such image formation, and instead are focused in manufacturing the print head assembly, e.g., not every image recording session would require the following method steps “fitting an illumination array of LED light sources into a housing”, “seating a lens array against said housing” (claim 37), or “providing at least one optical fiber” (claim 38), “forming a series of grooves in said housing” and “providing a reflective surface within at least one surface of at least one of said grooves” (claim 39). Such method steps would more fit to manufacture a print head to be use later to form an image onto a photosensitive medium.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made..

4. Claims 1-2, 5, 7, 12-13, 35-38, 40, 44-47, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda (U.S. 6,208,829) in view of Sato (U.S. 5,260,587).

Shimoda discloses in Figs. 6-7 an image forming apparatus comprising a multichannel print head for forming an image onto a photosensitive medium (16) by exposing pixels in a succession of exposures, the print head (exposure head 14) comprising an illumination array of light emitting diode light sources (array of LED array elements 120), a lens array (26) comprising a plurality of lenses (24), a light-guiding array of uniformizer elements (fiber array 20 as array of light transmission members), arranged between the light source array and the lens array, and wherein, for each pixel exposed on the photosensitive medium (16) a single said LED light source in said illumination array provides light into a single corresponding said uniformizer element in said light-guiding array which directs light to a corresponding said lens of said lens array (see Fig. 7).

Shimoda fails to teach the integral housing made of silicon into which are fitted the light emitting diode light sources, the fiber array and the lens array.

Sato discloses an optical semiconductor device comprising an array of LED elements (12), the lens array (14) and an array of optical fibers (11) aligned in a single correspondence on the same substrate (20) made of silicon.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the integral housing to hold the various optical elements together in the device of Shimoda as taught by Sato. The motivation for doing so would have been to fixedly and precisely align the various optical elements.

Shimoda further teaches the uniformizer being an array of optical fibers, the LED light sources emitting the same wavelength.

5. Claims 3-4, 6, 15, 39, 41, 43, 48, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda in view of Sato, as applied to claims 1, 37, 40, 45 above, and further in view of Pilosof et al. (WO 02/47915).

Shimoda, as modified by Sato, discloses all the basic limitations of the claimed invention except for the housing being formed from a base section and a cover section, the uniformizer elements comprising a reflective surface, a first set of grooves in the base section with a corresponding second set of grooves in the cover section.

Pilosof et al., an acknowledged prior art, discloses an imaging head comprising a laser diode array (21) and corresponding micro light-pipe array (12) provided in a housing including a base section and a cover section, with parallel grooves provided on each internal surface of the base section and the cover section, wherein the micro light-

pipe array can be configured either as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the uniformizer of Shimoda device as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers seated on parallel grooves provided on the internal face of the respective base and cover sections as taught by Pilosof et al. The motivation for doing so would have been to provide a rigid light transmission with an output illumination relatively uniform.

6. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoda in view of Sato, as applied to claims 1, 7 above, and further in view of Velikov (Pub. No. U.S. 2002/0131703).

Shimoda, as modified by Sato, discloses all the basic limitations of the claimed invention except for the lens array comprising a plurality of aspheric surfaces.

Velikov discloses a fiber-lens coupling system in a single correspondence wherein the lenses have preferably aspheric surfaces for reliable coupling.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the lenses in the device of Shimoda with aspheric surfaces as taught by Velikov. The motivation for doing so would have been to provide a reliable coupling between the optical fibers and the lenses as suggested by Velikov at paragraph [0006].

On the other hand, although the lenses are known to have sag and specific refractive index, Shimoda does not explicitly teach that the sag of any of the plurality of aspheric surfaces is less than about 40 microns and the refractive index greater than 2.0. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Shimoda with the lenses having the proper value of sag and refractive index as claimed, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

7. Claims 1, 14, 16-22, 24-26, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrigan et al. (U.S. 5,212,500) in view of Shimoda.

Harrigan et al. discloses a multi-channel print head comprising a plurality of light emitting elements (laser diodes) contained in a housing (50) at one end, wherein the housing includes a base section and a cover section and is provided with parallel grooves for receiving the linear array of optical fibers (60), and a lens assembly at the opposite end of the housing. With regard to claim 16, Harrigan et al. further teaches a media transport (drum 12), and a print head transport (translator member 16) for scanning the print head across the surface of the photosensitive drum.

Harrigan et al. fails to teach the lens assembly comprising a lens array arranged in a single correspondence with the laser diodes and the optical fibers.

Shimoda discloses a multichannel print head including a linear array of light emitting elements (120) arranged in single correspondence with a linear array of optical fibers (20) and a linear array of lenses (26) (Figs. 6-7).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the print head assembly of Harrigan et al. with a set of linear array of lenses as taught by Shimoda. The motivation for doing so would have been to prevent any crosstalk of the exposure light beams.

Harrigan et al. further teaches the print head transport member (16) including a lead screw (26), and the write laser diodes emitting light with the same wavelength and a secondary laser diode emitting light at a different wavelength and being used for focus adjustment.

8. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrigan et al. in view of Shimoda, as applied to claim 16 above, and further in view of Pilosof et al.

Harrigan et al. in view of Shimoda discloses all the basic limitations of the claimed invention except for the uniformizer elements comprising a reflective surface.

Pilosof et al., an acknowledged prior art, discloses an imaging head comprising a laser diode array (21) and corresponding micro light-pipe array (12) provided in a housing including a base section and a cover section, with parallel grooves provided on each internal surface of the base section and the cover section, wherein the micro light-

pipe array can be configured either as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the uniformizer of Harrigan et al. device as hollow light-pipes with the internal walls coated with a highly reflective coating or as comprising optical fibers seated on parallel grooves provided on the internal face of the respective base and cover sections as taught by Pilosof et al. The motivation for doing so would have been to provide a rigid light transmission with an output illumination relatively uniform.

9. Claims 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrigan et al. in view of Shimoda, as applied to claims 16, 26 above, and further in view of Velikov.

Harrigan et al., as modified by Shimoda, discloses all the basic limitations of the claimed invention except for the lens array comprising a plurality of aspheric surfaces.

Velikov discloses a fiber-lens coupling system in a single correspondence wherein the lenses have preferably aspheric surfaces for reliable coupling.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the lenses in the device of Harrigan et al. with aspheric surfaces as taught by Velikov. The motivation for doing so would have been to provide a reliable coupling between the optical fibers and the lenses as suggested by Velikov at paragraph [0006].

On the other hand, although the lenses are known to have sag and specific refractive index, Harrigan et al. does not explicitly teach that the sag of any of the plurality of aspheric surfaces is less than about 40 microns and the refractive index greater than 2.0. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Harrigan et al. with the lenses having the proper value of sag and refractive index as claimed, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

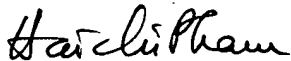
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2861

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM
PRIMARY EXAMINER

September 2, 2005